

from the coils 444 down to one side of the post 442 and the magnet 134, and a second leg 448 extending from the coils 444 down to the opposite side of the post 442 and the magnet 134.

[0054] The arrangement of the first spring 438 allows the cap 120 to be linearly displaced relative to the base 226, with the pins 128 traveling downward in the slots, against the resistance of the spring 438 being compressed by such linear displacement. Upon removal of the external downward force on the cap 120, the force exerted by the spring 438 in the upward direction will tend to return the cap 120 to its neutral linear displacement. The spring 438 will exert this force even when the cap 120 is rotated away from the neutral rotation, as is shown in FIG. 5c and FIG. 5d.

[0055] The arrangement of the second spring 440 allows the cap 120 to be rotationally displaced relative to the base 226, with the pins 128 rotating within the slots 130 against the resistance of the rotated fourth spring 440. Specifically, as the cap 120 rotates, the magnet 134 rotates away from its centered position and thereby displaces one of the two legs, for example the second leg 448 as shown in FIG. 5c. The rotation of the cap 120 displaces the second leg 448 relative to the first leg 446, thereby rotating the coils 444 of the fourth spring 440 and generating a force against the magnet 134 which opposes further rotation of the cap 120. Upon removal of the external force rotating the cap 120, the force exerted by the fourth spring 440 on the cap 120 (which may resolve into a net torque on the cap 120) will tend to return the cap 120 to the neutral angle. In alternative embodiments, the first leg 446 and the second leg 448 may not press against opposite sides of the magnet 134, but may instead press against opposite sides of a portion of the cap 120.

[0056] While the disclosure has been illustrated and described in detail in the drawings and foregoing description, such illustration and description is not restrictive in character, it being understood that illustrative embodiment (s) have been shown and described and that all changes and modifications that come within the spirit of the disclosure are desired to be protected. Alternative embodiments of the present disclosure may not include all of the features described yet still benefit from at least some of the advantages of such features. Those of ordinary skill in the art may devise their own implementations that incorporate one or more of the features of the present disclosure and fall within the spirit and scope of the appended claims.

What is claimed is:

1. A user actuated control comprising:

- a base;
- a roller movably connected to the base so as to allow rotational displacement between a neutral angle and a maximum angle and linear displacement between a neutral position and a depressed position;
- a magnet connected to the roller, the magnet positioned to rotate with rotational displacement of the roller, the magnet positioned to linearly displace with linear displacement of the roller;
- a sensor connected to the base, the sensor configured to measure both the orientation and intensity of a magnetic field produced by the magnet and passing through the sensor; and
- a spring assembly connected to the roller and the base, the spring assembly configured to exert a torque on the roller in the direction of the neutral angle when the roller is rotationally displaced from the neutral angle,

the spring assembly configured to exert a force on the roller in the direction of the neutral position when the roller is linearly displaced from the neutral position.

2. The control of claim 1, wherein the roller is movably connected to the base so as to allow rotational displacement between a minimum angle and the neutral angle, the neutral angle positioned between the minimum angle and the maximum angle.

3. The control of claim 2, wherein the roller is movably connected to the base so as to allow continuous rotational displacement between the minimum angle and the maximum angle.

4. The control of claim 3, wherein the sensor is configured to provide a rotation signal indicative of the rotational displacement of the roller based on the measured orientation of the magnetic field and to provide a linear signal indicative of the linear displacement of the roller based on the measured intensity of the magnetic field.

5. The control of claim 4, wherein the sensor is a Hall Effect sensor.

6. The control of claim 2, further comprising a shield positioned under the roller, wherein the shield is configured to allow linear displacement of the roller to the depressed position when the roller is at the neutral angle, the shield is configured to block linear displacement of the roller to the depressed position at a first angle of the roller, the shield is configured to block linear displacement of the roller to the depressed position at a second angle of the roller, the first angle is between the maximum angle and the neutral angle, and the second angle is between the neutral angle and the minimum angle.

7. The control of claim 6, wherein the shield is configured to allow linear displacement of the roller to the depressed position when the roller is at the maximum angle and the shield is configured to allow linear displacement of the roller to the depressed position when the roller is at the minimum angle.

8. The control of claim 6, wherein the shield is configured to block linear displacement of the roller to the depressed position when the roller is at the maximum angle and the shield is configured to block linear displacement of the roller to the depressed position when the roller is at the minimum angle.

9. A user actuated control comprising:

- a base;
- a roller positioned above the base and pivotally and slidably connected to the base about a pin disposed in a slot having a slot length;
- a top stop positioned to block further linear displacement of the roller in a first linear direction when the roller is at a neutral position;
- a bottom stop positioned to block further linear displacement of the roller in a second linear direction opposite the first linear direction when the roller is at a depressed position;
- a front stop positioned to block further rotational displacement of the roller in a first rotational direction when the roller is at a maximum angle;
- a rear stop positioned to block further rotational displacement of the roller in a second rotational direction opposite the first rotational direction when the roller is at a minimum angle;